

(Abdasa taluka). We sighted *Eryx johnii* with a *U. hardwickii* in its mouth (Fig. 1). In the beginning, I was unable to identify the lizard as only the head of the lizard was caught by the snake, and the rest of the body was inside the burrow. However, it was easily identified when the Sand Boa (*E. johnii*) threw out the entire body of the lizard. This act

tired the *E. johnii* and it rested for 40-55 seconds. It then threw out the entire body, and ate the lizard in 12 minutes and moved off slowly under the bushes of *Prosopis juliflora*.

Since *E. johnii* and *U. hardwickii* are common species in the sanctuary, both species (prey and predator) were easily identified by sight.

## REFERENCES

- MOLUR, S. & S. WALKER (EDS) (1998): Report of the Workshop 'Conservation assessment and Management Plan for Reptiles of India' (BCPP-Endangered Species Project), Zoo Outreach Organisation, Conservation Breeding Specialist Group, India, Coimbatore, 179 pp.
- SINGH, H.S. (2001): Natural heritage of Gujarat (forests and wildlife), Published by Gujarat Ecological Education & Research (GEER) foundation, Gandhinagar. 162 pp.
- VYAS, R. (2002): Preliminary survey of Herpetofauna of Narayan Sarovar Sanctuary, Gujarat. *Zoos' Print*. 17(6): 812-814.

## 12. DISCUSSION ON THE SNAKE FAUNA OF GUJARAT STATE, WITH SOME NOTABLE RECORDS

RAJU VYAS<sup>1</sup>

<sup>1</sup>505, Krishnadeep Tower, Mission Road, Fatehgunj, Vadodra 2, Gujarat, India. Email: razoovyas@hotmail.com

A literature survey indicates that the snake fauna of Gujarat State consists of 63 species and subspecies belonging to 41 genera and 8 families (Appendix 1) (Vyas 2000, 2006), indicating a diversified fauna. This richness and diversity of the snake fauna of the state is due to the diversity of habitat types in the state, from desert to moist deciduous forests, mudflats to mangrove forests and natural fresh water wetlands to saline gulfs. Gujarat is the place where all major hill complexes (from north to south: Aravali, Vindhya, Satpuda and Sahyadri) meet within relatively short distances. Such hill complexes and various types of habitat and microhabitats offer suitable habitat conditions for many living organisms, including snake species.

SNAKES OF INDIA – THE FIELD GUIDE by Whitaker and Captain (2004) covers a large number of species inhabiting India, and provides high quality illustrations, descriptions, and natural history with updated information of distribution of 157 snake species. In the book, the authors have not incorporated information on distribution of a few species of snakes, which have been recorded from Gujarat State, or have questioned the records of others.

In this paper, I enumerate records that are not incorporated in that publication or are incorporated as of doubtful occurrence in inhabiting the state.

### 1. *Grypotyphlops acutus* (Duméril & Bibron, 1844)

The published records of the species indicate that it is widely distributed in the state from Dangs (Daniel and Shull 1963), Navsari district (Navtad, Vansda National Park; Vyas 2004) in south Gujarat; Surendranagar district (Dhangadhra; Sharma 1982); Bhavnagar district (Bhavnagar) and Porbander district (Barda Wildlife Sanctuary) of Saurashtra (Vyas *et al.*

2000): Anand (Vallabh Vidhyanagar) and Ahmedabad (Gayen 1999: ZSI Reg. no 16.6.1920) of central Gujarat.

However, Whitaker and Captain (2004) show the distribution of the species as "south of the Ganges Basin and south of Rajasthan. Range extends west to Baroda and east to Calcutta". Emendation required in noting its distribution in entire Gujarat (except Kachchh).

### 2. *Uropeltis ellioti* (Gray, 1858)

The distribution of this species is restricted to the high hills of southern Dangs, south Gujarat. During the monsoons of 1987, I collected a number of specimens of the species at Sunset point of Saputara (20° 33' 58" N; 73° 44' 39" E) and Piplai Devi (Dangs) (Vyas 1988).

According to Whitaker and Captain (2004), this species is distributed in the Western Ghats, mostly to the south of Goa Gap, to Tirunelveli, with scattered records from Bengaluru, Gujarat, Maharashtra, and recently, from Madhya Pradesh (Panchmarhi), and also the Eastern Ghats up to Ganjam on the Andhra Pradesh-Orissa border. Here, an addition of Dangs, Gujarat State, is needed.

### 3. *Uropeltis macrolepis* (Peters, 1862)

I have been able to collect a 26.6 cm specimen of *U. macrolepis* along with *U. ellioti* from Sunset point of Saputara (20° 33' 58" N; 73° 44' 39" E), Dangs (Vyas and Jala 1988). This species was mentioned by Whitaker and Captain (2004), with the comment that 'the Dangs, Gujarat is probably the northern-most limit of its distribution'.

### 4. *Coelognathus helena monticollaris* (Schulz, 1992)

This subspecies is commonly found in the districts (Dangs, Surat, Nasari and Valsad) of south Gujarat (extreme

northern end of Western Ghats). Whitaker and Captain (2004) mentioned that it is distributed in Western Ghats (from Kerala, Tamil Nadu, Karnataka, Goa and Maharashtra) only.

##### 5. *Platyceps ventromaculatus* (Gray, 1834)

According to Whitaker and Captain (2004), this species is distributed in the Indian states of Jammu & Kashmir, Rajasthan and Gujarat, where the accompanying map shows its distribution in the entire Gujarat state. I have found it only at Banaskanth (Jassore Wildlife Sanctuary) and Kachchh (Kachchh Desert Sanctuary) districts.

##### 6. *Argyrogena fasciolata* (Shaw, 1802)

According to Whitaker and Captain (2004), this species is distributed throughout most of the peninsular plains (from Baroda to Gwalior) to the Himalayas. Unfortunately, the accompanying map does not show the distribution in Gujarat, where the species is abundant, and large size and numbers of specimens have been recorded from Bhavnagar (Vyas 1987) and Rajkot (Buch 1989) districts.

##### 7. *Chrysopelea ornata* (Shaw, 1802)

This species has been recorded from three different locations of the State - Satpura (Dangs; Vyas 1990), Purna Wildlife Sanctuary (Dangs; Vyas 2000), and Rajkot (Buch 1999). However, Whitaker and Captain (2004) mentioned the distribution of the species from forested hills of the South-west, Bihar, Orissa, West Bengal, forest of north-east India with the possibility from Maharashtra and Gujarat.

##### 8. *Lycodon flavomaculatus* (Wall, 1907)

Whitaker and Captain (2004) stated that the species record from Gujarat needs confirmation. Earlier, the species is recorded from Bhavnagar district (Bhavnagar City and Velavader National Park) (Vyas 1987; Vyas and Gadhvi 2003). Recently, a specimen was collected from Padra, Vadodara district and voucher specimen is available at the Museum of the Bombay Natural History Society, Mumbai (3434 BNHS).

##### 9. *Macropisthodon plumbicolor* (Cantor, 1839)

The species distributional map indicates the species is distributed only in southern Gujarat (Whitaker and Captain 2004). The species is found in the state from Banaskantha (Jassore Wildlife Sanctuary – adjoining border of Rajasthan) to Valsad districts of south Gujarat. Also, Gayen (1999) reported the species from Ahmedabad on the basis of ZSI Reg. No. 19203.

##### 10. *Boiga forsteni* (Duméril, Bibron & Duméril, 1854)

According to Whitaker and Captain (2004), the species is distributed in the Western Ghats from Gujarat to Kerala; Peninsular India – Ganges valley, Orissa, West Bengal and

Uttarakhand. Unfortunately, the accompanying map does not show its occurrence in the State. In Gujarat, this species has been recorded from Dangs (Saputara), Panchmahal (Pavagadh), Junagadh (Girnar hills) and Banaskantha (Jassore hills). Also, recorded from Abu hills of Rajasthan (Daniel 1962, 2002).

##### 11. *Calliophis melanurus* (Shaw, 1802)

The distribution is scattered throughout the State, being reported from the Dangs and Valsad districts of south Gujarat (Daniel and Shull 1963); Bhavnagar (Victoria Park and Hathab), Junagadh (Junagadh and Sasan) and Rajkot (Hingolghadh) districts in Saurashtra region. Whitaker and Captain (2004) mentioned its distribution in peninsular India with the comment 'not clearly known'. However, the accompanying map shows its distribution up to eastern Gujarat. I have never found the species from eastern Gujarat, and no records from the area are available till date.

##### 12. *Naja oxiana* (Eichwald, 1831)

According to Whitaker and Captain (2004), the authentic records are from India: Jammu & Kashmir, Himachal Pradesh, and probably Punjab. Though reported from Rajasthan and Gujarat, these records need confirmation, as they were possibly black, pattern less forms of *Naja naja*. Records from Kachchh (Chhari Dhandh; Akhtar and Tiwari 1991) and Banaskantha districts (Dhanera; Vyas 1998), Gujarat. These require authentication.

##### 13. *Trimeresurus gramineus* (Shaw, 1802)

According to Whitaker and Captain (2004), this species is distributed in the Western Ghats and its northernmost limit probably being the Dangs in Gujarat. However, I have been able to collect the species from Ratanmahal Wildlife Sanctuary, Dahod district further north from the known northern limits of the species. Also, the species occurs in dry deciduous forest areas of Chota Udaipur (Vadodara district) and Devgadhi Bariya (Dahod district).

Whitaker (1978) supported the above distribution range and mentioned the species is distributed in the 'Hills of India below a line drawn from Calcutta (now Kolkata) (in West Bengal) to Baroda (= Vadodara) (in Gujarat)'.

I believe, providing a voucher specimen or photograph of specimen is essential for establishing an authentic record else the record is deemed and is not considered as valid. Without any concrete evidence the particular record is considered as "suspicious".

The above mentioned species are not incorporated unambiguously and some of the records are incorporated with a question of probability. This might be due to the lacuna of establishing authenticity of record by recorders in the form of deposition of voucher specimen. But, the record of species

(from particular areas) cannot always be rejected on the ground of missing voucher specimen. Because obtaining a voucher specimen (for museum) is not possible if the species is recorded from Protected Areas or is under legal protection. Most of the Indian herpetologists (especially taxonomists) acknowledge that obtaining permission for such a collection is not so easy, especially when work in the above situation is along typical Indian bureaucratic scenarios.

However, here I have tried to establish that the above discussed species are recorded from the state, and vouchers of some of the species (Appendix 2) are available at museum

of the Bombay Natural History Society, Mumbai and Zoological Survey of India, Kolkata.

#### ACKNOWLEDGEMENTS

I thank C.N. Pandey, Director, Gujarat Ecological Education (GEER) Foundation and Pradeep Khanna, Chief Conservator of Forest (Wildlife), Gujarat Forests Department, Gandhinagar, Gujarat State, India, for logistic support and permission for the study. Late Naresh Chaturvedi, BNHS, helped with voucher registration, and Varad Giri, Curator, BNHS, provided valuable comments on an earlier draft.

#### REFERENCES

- AKHTAR, A.S. & J.K. TIWARI (1991): Extension of range of the Black Cobra *Naja naja oxiana*. *J. Bombay Nat. Hist. Soc.* 88(1): 123.
- BUCH, S.M. (1989): A record Banded Racer (*Argyrogena fasciata*). *Hamadryad* 14(2): 29.
- BUCH, S.M. (1999): A flying snake (*Chrysopelea ornata*) in a rural area near Rajkot city (Gujarat). *Cobra* (35 & 36): 33.
- DANIEL, J.C. (1962): Extension of the known range of the Cat Snake, *Boiga forsteni* (Dum & Bir.). *J. Bombay Nat. Hist. Soc.* 59(3): 966-967.
- DANIEL, J.C. (2002): The Book of Indian Reptiles and Amphibians. Bombay Natural History Society, Oxford University Press, Bombay. 238 pp.
- DANIEL, J.C. & E.M. SHULL (1963): A list of the reptiles and amphibians of Surat, Dangs, south Gujarat. *J. Bombay Nat. Hist. Soc.* 60: 737-743.
- GAYEN, N.C. (1999): A synopsis of the reptiles of Gujarat, western India. *Hamadryad* 24: 1-22.
- SHARMA, R.C. (1982): Taxonomic and ecological studies on the reptiles of Gujarat. *Record of Zoological Survey India* 80: 85-108.
- VYAS, R. (1987): A list of the snakes of Bhavnagar district, Gujarat state. *J. Bombay Nat. Hist. Soc.* 84(1): 227-230.
- VYAS, R. (1988): Notes on snakes from district Dang, Gujarat state. *J. Bombay Nat. Hist. Soc.* 85(1): 200.
- VYAS, R. (1990): Golden tree snake. *J. Bombay Nat. Hist. Soc.* 87(2): 309.
- VYAS, R. (1998): The reptiles of Gujarat state: Updated distribution. *Tigerpaper* 25(1): 8-14.
- VYAS, R. (2000): Comments on 'A synopsis of the reptiles of Gujarat, India'. *Hamadryad* 25(2): 203-207.
- VYAS, R. (2004): Herpetofauna of Vansda National Park, Gujarat. *Zoos' Print J.* 19(6): 1512 - 1514.
- VYAS, R. (2006): Story of a snake's photograph from Gujarat and notes on further distribution of the Indian egg-eater snake. *Herpinstance* 3(2): 1-4.
- VYAS, R. & I.R. GADHVI (2003): Preliminary Survey on herpetofauna of Blackbuck National Park, Gujarat, India. *Tigerpaper* 30(2): 11-14.
- VYAS, R. & C. JALA (1988): The Bombay Shield Tail Snake (*Uropeltis macrolepis*: Peters) collected from the Saputara, Dang. *Herpeton* 1(1): 16.
- VYAS, R., K. BHATT & I. GADHVI (2001): Length record of the beaked worm snake (*Rhinotyphlops acutus*) and its distribution in Gujarat. *Zoos' Print J.* 16(7): 549-550.
- WHITAKER, R. (1978): Common Indian Snakes. The Macmillan Co. of India, New Delhi. 154 pp.
- WHITAKER, R. & A. CAPTAIN (2004): Snakes of India – The Field Guide. Draco Books, Chennai, India. xiv+ 481 pp.

#### Appendix 1

List of snake species recorded from Gujarat State, India

<b>Family: Typhlopidae</b>	12. <i>Ahaetulla pulverulenta</i> *	31. <i>Macropisthodon plumbicolor</i>	49. <i>Ophiophagus hannah</i> *
1. <i>Ramphotyphlops braminus</i>	13. <i>Amphiesma stolatum</i>	32. <i>Oligodon arnensis</i>	<b>Family: Hydrophidae</b>
2. <i>Grypotyphlops acutus</i>	14. <i>Argyrogena fasciolata</i>	33. <i>Oligodon taeniolatus</i>	50. <i>Enhydrina schistosa</i>
3. <i>Typhlops porrectus</i>	15. <i>Atretium schistosum</i> *	34. <i>Oligodon venustus</i> *	51. <i>Hydrophis caeruleus</i>
<b>Family: Uropeltidae</b>	16. <i>Boiga forsteni</i>	35. <i>Psammophis condanarus</i> *	52. <i>Hydrophis cantoris</i>
4. <i>Uropeltis ellioti</i>	17. <i>Boiga trigonata</i>	36. <i>Psammophis leithii</i>	53. <i>Hydrophis cyanocinctus</i>
5. <i>Uropeltis macrolepis macrolepis</i>	18. <i>Cerberus rynchops</i>	37. <i>Psammophis longifrons</i>	54. <i>Hydrophis gracilis</i>
6. <i>Uropeltis ocellatus</i> *	19. <i>Chrysopelea ornata</i>	38. <i>Psammophis schokari</i> *	55. <i>Hydrophis lapemoides</i>
<b>Family: Boidae</b>	20. <i>Platyceps ventromaculatus</i>	39. <i>Ptyas mucosa</i>	56. <i>Hydrophis mamillaris</i>
7. <i>Gongylophis conicus</i>	21. <i>Coronella brachyura</i>	40. <i>Sibynophis subpunctatus</i>	57. <i>Hydrophis spiralis</i>
8. <i>Eryx johnii johnii</i>	22. <i>Dendrelaphis pictus</i> *	41. <i>Spalerosophis diadema</i>	58. <i>Lapemis curtus</i>
<b>Family: Pythonidae</b>	23. <i>Dendrelaphis tristis</i>	42. <i>Xenochrophis piscator</i>	59. <i>Pelamis platura</i>
9. <i>Python molurus molurus</i>	24. <i>Elachistodon westermanni</i>	<b>Family: Elapidae</b>	<b>Family: Viperidae</b>
<b>Family: Acrochordiae</b>	25. <i>Coelognathus helena helena</i>	43. <i>Bungarus caeruleus</i>	60. <i>Daboia russelii</i>
10. <i>Acrochordus granulatus</i>	26. <i>Coelognathus helena monticollaris</i>	44. <i>Bungarus sindanus</i>	61. <i>Echis carinatus</i>
<b>Family: Colubridae</b>	27. <i>Gerarda prevostiana</i>	45. <i>Calliophis melanurus</i>	62. <i>Echis carinatus sochurki</i>
11. <i>Ahaetulla nasuta</i>	28. <i>Lycodon aulicus</i>	46. <i>Calliophis nigrescens</i>	63. <i>Trimeresurus gramineus</i>
	29. <i>Lycodon flavomaculatus</i>	47. <i>Naja naja</i>	
	30. <i>Lycodon striatus</i>	48. <i>Naja oxiana</i> *	

\*Species need confirmation

Appendix 2: List of some important snake specimens in the BNHS Collection

Species Name	<i>G. acutus</i>	<i>U. ellioti</i>	<i>U. macrolepis</i>	<i>P. ventromaculatus</i>	<i>A. fasciolata</i>	<i>C. ornata</i>	<i>L. flavomaculatus</i>	<i>M. plumbicolor</i>	<i>C. melanurus</i>
Museum Registration No.	BNHS 3226	BNHS 3430	BNHS 3431	BNHS 3406	BNHS 2253	BNHS 3433	BNHS 3433	BNHS 3436	BNHS 3435
Collection Locality	Purna WS, Dangs	Saputara, Dangs	Saputara, Dangs	Karja, JWS, Banaskantha	Old Port, Bhavnagar	Purna WS, Dangs	Padara, Vadodara	Jessore WS, Banaskantha	Victoria Park, Bhavnagar
Snout to Vent Length	62.39	25.50	27.50	70.50	144.50	56.50	35.50	24.50	23.00
Tail Length	0.70	0.90	0.50	27.00	25.50	21.00	7.20	3.70	2.80
Total Body Length	63.09	26.40	28.00	97.50	180.00	77.50	42.70	28.20	25.80
Number of Body Rows	28	17	15	19:19:15	18:23:21	15:17:14	17:17:15	23:25:17	13:13:13
Number of Ventrals	458	157	126	208	225	220	181	145	244
Number of Sub-caudals	-	6	8	98	92	128	60	40	28
Supralabials	-	-	-	9	8	10	9	7	6
Number of Scales Touching	-	-	-	5 <sup>th</sup> & 6 <sup>th</sup>	4 <sup>th</sup> & 5 <sup>th</sup>	4 <sup>th</sup> , 5 <sup>th</sup> & 6 <sup>th</sup>	3 <sup>rd</sup> , 4 <sup>th</sup> & 5 <sup>th</sup>	3 <sup>rd</sup> & 4 <sup>th</sup>	3 <sup>rd</sup> & 4 <sup>th</sup>
Infralabials	-	-	-	9	9	9	10	10	7
Sex	N.D.	N.D.	N.D.	Female	Female	Male	N.D.	Female	N.D.

*G. acutus*: *Gnypotyphlops acutus*; *U. ellioti*: *Uropeltis ellioti*; *U. macrolepis*: *Uropeltis macrolepis*; *P. ventromaculatus*: *Platyceps ventromaculatus*; *A. fasciolata*: *Argyrogena fasciolata*; *C. ornata*: *Chrysopaalea ornata*; *L. flavomaculatus*: *Lycodon flavomaculatus*; *M. plumbicolor*: *Macropisthodon plumbicolor*; *C. melanurus*: *Calliophis melanurus* (measurements in cm; N.D. = Sex not determined; - = Value not taken)